WHAT IS CLAIMED IS:

1. A magnetic recording medium comprising:

a substrate;

an underlayer formed on the substrate;

- a magnetic layer formed on the underlayer, wherein the magnetic layer comprising crystal grains having
- (a) an Ll_0 structure mainly including Fe and Pt, and
- (b) 0.1 to 50 atomic percent of at least one element selected from the group consisting of Cu, Au, Zn, Sn, Pd and Mn; and

a protective layer formed on the magnetic layer.

- 2. The medium according to claim 1, wherein the substrate is a glass substrate.
- 3. The medium according to claim 1, wherein the crystal grain has a composition represented by the following formula:

 $(Fe_{1-x}Pt_x)_{100-y}M_y$

where x ranges from 0.4 to 0.6, y ranges from 0.1 to 50, M is at least one element selected from the group consisting of Cu, Au, Zn, Sn, Pd and Mn.

- 4. The medium according to claim 3, wherein x ranges from 0.4 to 0.56, y ranges from 3 to 20.
- 5. The medium according to claim 1, wherein the magnetic layer has a thickness of 50 nm or less.
 - 6. A magnetic recording medium comprising: a substrate;

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an underlayer formed on the substrate;

- a magnetic layer formed on the underlayer, wherein the magnetic layer comprising crystal grains having
- (a) an $L1_0$ structure mainly including Fe and Pd, and
- (b) 0.1 to 50 atomic percent of at least one element selected from the group consisting of Cu, Au, Zn, Sn and Mn; and

a protective layer formed on the magnetic layer.

- 7. The medium according to claim 6, wherein the substrate is a glass substrate.
- 8. The medium according to claim 6, wherein the crystal grain has a composition represented by the following formula:

 $(Fe_{1-x}Pd_x)_{100-y}M_y$

where x ranges from 0.4 to 0.6, y ranges from 0.1 to 50, M is at least one element selected from the group consisting of Cu, Au, Zn Sn and Mn.

- 9. The medium according to claim 8, wherein x ranges from 0.4 to 0.56, y ranges from 3 to 20.
- 10. The medium according to claim 6, wherein the magnetic layer has a thickness of 50 nm or less.
 - 11. A magnetic recording medium comprising:
 a substrate;
- an underlayer formed on the substrate;

a magnetic layer formed on the underlayer, wherein the magnetic layer comprising crystal grains having

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 λ_a) an L10 structure mainly including Co and Pt, and

- (b) 0.1 to 50 atomic percent of at least one element selected from the group consisting of Ni, Au and Mn; and
 - a protective layer formed on the magnetic layer.
- The medium according to claim 11, wherein the 12. substrate is a glass substrate.
- 13. The medium according to claim 11, wherein the crystal grain has a composition represented by the following formula:

 $(Co_{1-x}Pt_x)_{100-v}M_v$

where x ranges from 0.4 to 0.6, y ranges from 0.1to 50, M is at least one element selected from the group consisting of Ni, Au and Mn.

- The medium according to claim 13, wherein x ranges from 0.4 to 0.56, y ranges from 3 to 20.
- The medium according to claim 11, wherein the magnetic layer has a thickness of 50 nm or less.